REMARKS

Overview

Claims 7-10, 12, 13, 15 and 17-20 are pending in this application. Claims 21-26 are new. The present response is an earnest effort to place all claims in proper form for immediate allowance. Reconsideration and passage to issuance is therefore respectfully requested.

Issues Under 35 U.S.C. § 103

Claims 7-10, 12-13, 15, and 17-20 have been rejected under 35 U.S.C. § 103 as being obvious over U. S. Patent No. 6,023,217 to Yamada et al. in view of U. S. Patent No. 3,474,305 to Szupillo, U. S. Application No. 2001/0017770 to Copetti et al. or Sato (61-27264). These rejections are respectfully traversed. Because Yamada does not disclose an outer layer of a tantalum oxide, the Examiner relies upon Sato, Copetti or Szupillo as suggesting there is motivation to replace the screen-printed barrier layer of Yamada with tantalum oxide (Office Action, p. 3, numbered paragraph 3). The Examiner's motivation for this assertion is "that one known prior art dielectric can be replaced for another since they are both dielectrics and are used as barriers, and are compatible with the same materials".

Applicant strongly contends that the Examiner's motivation is fatally flawed. Specifically, there are several prior art dielectrics that are hydrophilic, having a high moisture uptake, but still used as a barrier and yet compatible with nichrome. For example, polyamides tend to be hydrophilic, compatible with Nichrome and capable of providing a barrier. However, replacing the screen-printed layer of Yamada with certain polyamides ("one known prior art dielectric"), as suggested by the Examiner, totally defeats Applicants objectives and teaches directly away from independent claims 7, 13, 15 and 17, which require a thin chip resistor

resistant to moisture or electrolytic corrosion. Attached at Exhibit 1 on page 43 is further evidence that dielectrics that form barriers do not necessarily form moisture barriers. Since the motivation for combining Yamada with Sato, Copetti or Szupillo is flawed, the obviousness rejection must be reversed.

Furthermore, the Federal Circuit has explained, "Under § 103, teachings of references can be combined only if there is some suggestion or incentive to do so. . . . The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." (*emphasis added*). In re Fritch, 23 U.S.P.Q. 1780, 1783-84 (Fed Cir. 1992). Applicant's specific use of tantalum oxide as a moisture barrier in a thin film resistor is not disclosed or taught in Yamada, Sato, Copetti or Szupillo. In fact, none of the cited references teaches that tantalum oxide can be used as a moisture barrier. Sato is directed to a thermal head and not a thin film chip resistor and discloses sputtering a layer of tantalum pentoxide as an abrasion resistance layer. Copetti uses dielectrics such as tantalum pentoxide as an insulator layer to separate conductive layers. Szupillo discloses using oxidized films to form an electrically insulative barrier layer. Thus, it would be obvious to use the tantalum oxide as an abrasion resistant, insulative and electrical insulative layer, but not as a moisture resistant layer. The cited references simply do not teach that tantalum oxide has a very low moisture uptake, thus providing a moisture resistant layer when used as a barrier, as Applicant has done.

Lastly, attached at Exhibit 2 is a copy of EP 1377990, which is directed toward the same invention. It is respectfully submitted that Europe's recognition of novelty and inventive step of the present invention is akin to a secondary indicia of non-obviousness that should be considered.

Claim 7 would not be obvious over Yamada in view of Szupillo, Copetti or Sato. Claim 7 requires a thin film chip resistor "without use of a screen-printed moisture barrier". Yamada discloses an outer protective barrier 24, which is a thermally cured and screen-printed resin paste (Col. 3, lines 40-41 & Col. 4, lines 18-22). Alternatively, Yamada discloses screen-printing a protective layer 54 with glass paste (Col. 17, lines 65-Col. 8, line 3). This teaching is contrary to the claimed invention. Moreover, a primary object of Applicant's invention is to provide "a moisture barrier for a thin film resistor [which] replaces screen-printed moisture barriers" (Specification, page 2). It is a further object of the present invention to provide for "a moisture barrier for a thin film resistor that is compatible with normal manufacturing techniques and materials" (Specification, page 2). The screen-printed moisture barriers, used by Yamada, would not fall under the genre of normal manufacturing techniques. Thus, Yamada is wholly inconsistent with both of Applicant's objectives. Claim 7 further requires "an outer moisture barrier formed from deposition of tantalum oxide on the metal thin film resistive layer and not through oxidation of tantalum". Yamada discloses no such teaching and Examiner concurs (Office Action, p. 2, numbered paragraph 2). These limitations emphasize the differences between Yamada and the claimed invention.

Applicant's work recognizes problems in the prior art that Yamada does not address. Whereas Applicant's invention provides a moisture barrier to a non-tantalum thin film resistor without screen-printing, Yamada's invention does not. Here, neither Yamada or the other prior art references speak to the particular problem addressed by the present invention and the problem is clearly presented in the claims. Specifically, claim 7 requires that the problem be addressed by creating a moisture barrier "without use of a screen-printed moisture barrier". In short, as stated by the Federal Circuit, "The problem solved by the invention is always relevant." *In re Wright*,

838 F.2d 1216, 6 U.S.P.Q.2d 1959, 1961 (Fed. Cir. 1988). Applicant requests that Examiner consider as a part of the obviousness inquiry the specific problem unrecognized and unsolved by the prior art as being recognized and solved by the present invention.

Claim 7 is not obvious in view of combining Yamada and Szupillo. For instance, claim 7 requires "a continuous metal thin film resistive layer". Szupillo does not disclose the continuous thin film layer of Applicant's claimed invention. Instead, Szupillo is specifically directed towards a discontinuous layer of film. Szupillo further discloses oxidizing tantalum film to produce tantalum pentoxide (column 8, lines 5-21). Thus, Szupillo cannot fairly be used to disclose using both a non-tantalum thin film and a layer of tantalum pentoxide in the same device. Moreover, Szupillo's use of tantalum oxide is for a different purpose than Applicant's. Furthermore, the deposition of tantalum pentoxide in Szupillo does not serve as an outer moisture barrier as required by claim 7, but rather serves as an insulator. This is clear from column 5, lines 23-27 which refer to a barrier layer 22 as "composed of a suitable electrical insulating material such as silicon dioxide, barium oxide, tantalum pentoxide, titanium dioxide or the like". Thus, Szupillo makes clear that there is an electrically insulating layer but does not treat or use this electrically insulating layer as a moisture barrier. Therefore, it is respectfully submitted that the Examiner has not established a *prima facie* case of obviousness in respect to this combination.

Claim 7 is also not obvious in view of combining Yamada and Copetti. In particular, it is observed that Copetti teaches a module that includes a thin-film circuit. In Copetti, capacitors, or capacitors and resistors, or capacitors, resistors and inductors are provided next to the conductive track directly on a substrate of an insulating material (Abstract). Each of the disclosed embodiments of Copetti requires both a dielectric layer and a protective layer. Further yet, each

embodiment requires "at least one contact hole passing through the module" (column 3, line 29). Having a contact hole through both the dielectric and protective layers to facilitate creation of electrical conduit between barriers would not form an effective moisture barrier as required by claim 7. Thus, Copetti teaches away from Applicant's claimed invention.

Copetti discloses using tantalum pentoxide as one of a number of dielectrics because of its relative dielectric constant (column 2, lines 60-68). Copetti does not select the tantalum pentoxide for use as a moisture barrier, but simply as a dielectric. Furthermore, Copetti uses a separate protective layer to protect the adjacent layers from mechanical loads and corrosion by moisture (column 3, lines 1-4), which strongly supports a finding that Copetti did not foresee using tantalum pentoxide as a moisture barrier. Thus, Copetti actually teaches away from the use of the tantalum pentoxide as a moisture barrier.

Claim 7 is also not obvious in view of combining Yamada and Sato. In the Examiner's combination of Yamada with Sato, the Examiner indicates that "Sato discloses sputtering a tantalum oxide layer for the purpose of providing a protective layer so that it would have been obvious to employ a sputtered layer, to replace a protective layer of Yamada, for protection where the references disclose a protection layer or double protection layer for a resistor." (Office Action, page 2, numbered paragraph 2). To the extent the Examiner relies upon Sato, it is noted that Sato is directed towards a very different type of invention, namely a thermal head. To the extent that a thermal head includes heat-generating resistors is not enough to make a thermal head an analogous art. In relying upon Sato, the Examiner fails to acknowledge that a thermal head is not a chip resistor. Moreover, the purpose of the abrasion resistant layer 6 in Sato is to stabilize printing quality by forming a protective layer before applying the heat treatment. Examiner does not use Sato for this purpose. In addition, the Examiner does not properly

consider the differences in the purposes for using a protective layer in the context of a thermal head and a protective layer in the context of a thin film strip resistor. The Examiner's consideration of a layer only as "protection" is too general and not specific enough to establish a proper rejection, particularly when the references use "protective" layers of different materials for different purposes. Therefore, it is respectfully submitted that the Examiner has not made a *prima facie* case of obviousness as the Examiner has not provided a proper motivation or suggestion to combine these references. It is further observed that the Examiner has not specifically cited to either reference for the proposition that a sputtered tantalum oxide layer of a thermal head in Sato should replace a cured epoxy resin or glass protective layer of a chip resistor of Yamada. Instead, the Examiner applies hindsight reconstruction that eviscerates that which makes the invention patentable or using tantalum pentoxide as an outer moisture barrier in a chip resistor.

As claims 8-10 and 12 depend from claim 7 it is respectfully submitted that these rejections be withdrawn as well. The rejections to claims 13, 15, and 17-20 should also be withdrawn.

With respect to claim 12, there is an independent basis for patentability as claim 12 requires that the tantalum pentoxide layer is overlaid by sputtering. Sputtering is not the same as screen-printing. Not one of the references discloses sputter depositing a layer of tantalum oxide *to provide a moisture barrier in a thin film resistor.* Specifically, Yamada discloses screen-printing a protective layer for a thin film resistor. Szupillo discloses using oxidized films to form an electrically insulative barrier layer and lists tantalum pentoxide as one type of material that could be used. Sato is directed to a thermal head and not a thin film chip resistor and discloses

sputtering a layer of tantalum pentoxide as an abrasion resistance layer. Copetti uses dielectrics such as tantalum pentoxide to separate conductive layers.

With respect to claim 13, there is an independent basis for patentability as claim 13 requires "a moisture barrier consisting of tantalum pentoxide directly overlaying and contacting the nickel-chromium alloy thin film layer for reducing failures due to electrolytic corrosion under powered moisture conditions". Neither Yamada nor Copetti disclose this limitation. At best, Copetti discloses use of tantalum pentoxide as an insulator and discloses an outer moisture barrier of a different material. Thus, neither reference discloses using tantalum pentoxide as a moisture barrier in a resistor. Therefore, this rejection must be withdrawn.

With respect to claim 15, there is an independent basis for patentability as claim 15 requires "an outer moisture barrier consisting of tantalum pentoxide directly overlaying and contacting the passivation layer for reducing failures due to electrolytic corrosion under powered moisture conditions" and "the outer moisture barrier formed from deposition of tantalum oxide on the passivation layer". These limitations are not disclosed in either Yamada or Copetti. Therefore, this rejection must also be withdrawn.

New Claims

Claims 21-26 are new. Support for the new claims is found in the specification as originally filed, including the drawings. Claims 21-26 further distinguish over the cited prior art by providing specific product-by-process limitations. The product-by-process claims for manufacturing the thin film chip resistor renders the product distinct since there are structural distinctions created by the process. Specifically, the structure in Yamada does not disclose an outer layer of a tantalum oxide overlaying the metal film resistive layer, as required by the new

claims. Applicant's claimed invention is not a thermal head like Sato and thus has structural differences over Sato. In Sato, the resistance heating element is coated with a low melting point glass which comes in contact with recording paper to prevent oxidation of the thermal head. Whereas, in Applicant's, a metal film resistance layer is overlaying the resistor substrate. Additionally, Sato does not contemplate, nor consider, using the sputtered layer of tantalum pentoxide as a moisture resistance barrier. Copetti calls for using dielectrics such as tantalum pentoxide as an insulator layer to separate conductive layers, in addition to at least one contact hole, which passes through the module. Applicant use of tantalum pentoxide is to eliminate moisture uptake by the thin film chip resistor and is overlaying the resistor substrate. Szupillo discloses that the second and outer barrier layer 26 is barium oxide, not tantalum pentoxide. Applicant's barrier is tantalum pentoxide. Furthermore, Szupillo uses oxidized films to form an electrically insulative barrier layer, yet Applicant's tantalum pentoxide is not formed by natural oxidation.

Conclusion

Please charge Deposit Account No. 26-0084 for the additional fee of $400.00 for the 2 additional independent claims over 3. No other fees or extensions of time are believed to be due. However, consider this a request for any extension inadvertently omitted, and charge any additional fees to Deposit Account No. 26-0084.

Reconsideration and allowance is respectfully requested.

Respectfully submitted,

JOHN D. GOODHUE, Reg. No. 47,603
McKEE, VOORHEES & SEASE, P.L.C.
801 Grand Avenue, Suite 3200
Des Moines, Iowa 50309-2721
Phone No: (515) 288-3667
Fax No: (515) 288-1338
CUSTOMER NO: 22885

Attorneys of Record

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